

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE  
Before the Board of Patent Appeals and Interferences

In re Patent Application of

LINDQVIST et al.

Serial No. 09/584,796

Filed: June 1, 2000

Title: A FREQUENCY DOMAIN BOARD CANCELLER

Atty Dkt. JRL-1410-679

C# M#

TC/A.U.: 2643

Examiner: Jamal, Alexander

Date: May 18, 2007



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**Mail Stop Appeal Brief - Patents**

Commissioner for Patents  
P.O. Box 1450  
Alexandria, VA 22313-1450

Sir:

☐ **Correspondence Address Indication Form Attached.**

☐ **NOTICE OF APPEAL**

Applicant hereby **appeals** to the Board of Patent Appeals and Interferences  
from the last decision of the Examiner twice/finally rejecting \$500.00 (1401)/\$250.00 (2401) \$  
applicant's claim(s).

☐ An appeal **BRIEF** is attached in the pending appeal of the  
above-identified application \$500.00 (1402)/\$250.00 (2402) \$

☐ Credit for fees paid in prior appeal without decision on merits -\$ ( )

☒ **A supplemental reply brief is attached.** (no fee)

☐ Petition is hereby made to extend the current due date so as to cover the filing date of this  
paper and attachment(s)  
One Month Extension \$120.00 (1251)/\$60.00 (2251)  
Two Month Extensions \$450.00 (1252)/\$225.00 (2252)  
Three Month Extensions \$1020.00 (1253)/\$510.00 (2253)  
Four Month Extensions \$1590.00 (1254)/\$795.00 (2254) \$

☐ "Small entity" statement attached.

Less month extension previously paid on -\$ ( )

**TOTAL FEE ENCLOSED \$ 0.00**

Any future submission requiring an extension of time is hereby stated to include a petition for such time extension.  
The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or  
asserted to be filed, or which should have been filed herewith (or with any paper hereafter filed in this application by this  
firm) to our **Account No. 14-1140**. A duplicate copy of this sheet is attached.

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NIXON & VANDERHYE P.C.  
By Atty: John R. Lastova, Reg. No. 33,149

Signature: \_\_\_\_\_



**IN THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Patent Application of

LINDQVIST et al.

Atty. Ref.: 1410-679; Confirmation No.

Appl. No. 09/584,796

TC/A.U. 2643

Filed: June 1, 2000

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For: A FREQUENCY DOMAIN ECHO CANCELLER

\* \* \* \* \*

May 18, 2007

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Sir:

**SUPPLEMENTAL REPLY BRIEF**

This reply brief addresses new issues raised in the Examiner's Supplemental Answer.

The Examiner ignores the fact that in Ho's echo canceler, part of the echo is estimated and removed in the frequency domain, (part of the echo  $E(f)$  is estimated in block 110 and subtracted at summer 58), and part of the echo must be estimated and removed in the time domain, ( $e(n)$  is estimated using blocks 130, 140, and 150 and subtracted at summer 52). See Figures 3 and 4. In contrast, in claims 1 and 12, the echo is modeled in the frequency domain. Ho does not (and can not) model or remove the echo due to a previous symbol *in the frequency domain*.

The claims do not recite that only part of the echo is estimated in the frequency domain. Rather, as one of ordinary skill in the art would understand from the claims and the specification,

the echo in the claims is the full echo. Thus, when one reads the beginning of claim 20, for example, "An echo canceller for use in a transceiver canceling an echo from a received signal in the frequency domain including circuitry configured to determine an estimate of the echo in the received signal using a frequency domain model of an echo path channel...", it is clearly understood that the echo being referred to is not just a part of that echo.

Nor is it a *reasonable* broadest construction to interpret the term "echo" as just part of the echo. Indeed, it is common sense and commonly understood that when people say that they hear an echo during a telephone call, they are not referring to just part of the echo, but rather the entire echo that they hear. This understanding is found in Ho which describes the echo signal as having "a time-domain echo  $e(n)$  part and a frequency-domain echo  $E(f)$  part" (col. 6, lines 2-3 (emphasis added)), and explains that:

After the adder 52 subtracts the time-domain portion of the echo,  $e(n)$ , the output is converted by a serial-to-parallel (S/P) converter 54 into a block of N real-valued time-domain samples. The resultant signal is then passed through an FFT 56 to produce a block of N complex-valued "frequency-domain" samples. The frequency-domain portion of the echo  $E(f)$  is then subtracted by adder 58, to produce an (ideally) echo-free receive block  $R_{ef}(f)$ .

Col. 6, lines 10-19 (emphasis added).

For the proposed combination, the Examiner explains that Dowling's precoder would take the place of Ho's encoder 12 and admits that the transmission channel is not the same as the echo channel ("In response to appellant's arguments that the examiner is making the assumption that the transmission channel is the same as the echo channel, the examiner strongly disagrees." Page 3). In that combination, Dowling's precoder simply pre-compensates the signal for distortion caused by the transmission channel and provides that pre-distorted signal. Nothing in Dowling's precoder compensates for echo. That's why Dowling mentions that the precoder

could be used with an echo canceler. If the precoding compensated for the echo, no echo canceler would be needed. Ho's echo canceler will receive Dowling's precoded signal and estimates part of the echo in the frequency domain and part in the time domain. So Dowling combined with Ho still requires that part of the echo be estimated in the time domain.

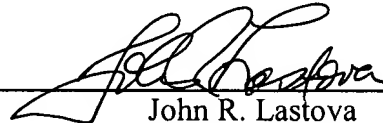
The Examiner urges the Board to consider the "additional viewpoint" that "the echo canceller of Ho would function to remove all forms of echo." Page 4. But even assuming that is true, Ho still removes part of "all forms of echo" in the time domain and part in the frequency domain. In contrast, the claimed echo canceler is a frequency domain echo canceler.

For the reasons explained here and in the Appeal and Reply Briefs, the independent claims are not disclosed or suggested by the combination of Ho and Dowling or Chaffee and Dowling. The Board should reverse the outstanding rejections.

Respectfully submitted,

**NIXON & VANDERHYE P.C.**

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